

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A method of defect root cause analysis comprising following steps:

- 5 providing a sample being processed through a plurality of semiconductor processes,
wherein the sample which comprises a plurality of defects;
- performing a defect inspection to detect sizes and locations of the plurality of defects;
- performing a chemical state analysis of the sample;
- 10 performing a mapping analysis according to a result of the chemical state analysis,
wherein the mapping analysis comprises:
 - forming the defects into a defect pattern; and
 - combining comparing the defect pattern with a predetermined pattern on the sample; and
- 15 analyzing the root cause of the defects according to the comparison between
combination of the defect pattern and the predetermined pattern on the sample for
determining the semiconductor process causing the defect.

- 20 Claim 2 (original): The method of claim 1 further comprising performing a defect classification after finishing the defect inspection for judging a defect type of the defects and performing a corresponding chemical state analysis according to the defect type of the defects.

- 25 Claim 3 (original): The method of claim 1 wherein an auger analysis is performed in the chemical state analysis when the defects are smaller than 0.2 μ m or are not single phase particles.

- Claim 4 (original): The method of claim 3 wherein the auger analysis utilizes a scanning

auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform the chemical state analysis of the sample.

Claim 5 (original): The method of claim 1 wherein an energy dispersive spectrometer

5 (EDS) is utilized to detect in the chemical state analysis when the defects are equal to or larger than $0.2 \mu m$, single phase, or thick particles.

Claim 6 (original): The method of claim 1 wherein the chemical state analysis comprises a point scan analysis, delayer analysis, and depth profile analysis.

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Claim 7 (currently amended): A method of defect root cause analysis comprising following steps:

providing a sample being processed through a plurality of semiconductor processes, wherein the sample comprises with a plurality of defects;

15 performing a voltage contrast to identify locations of the defects;
cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample;
utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample;

20 performing a mapping analysis according to a result of the chemical state analysis, wherein the mapping analysis comprises:

forming the defects into a defect pattern; and

combining comparing the defect pattern with a predetermined pattern on the sample;
and

25 judging a root cause of the defect generation according to the comparison between combination of the defect pattern and the predetermined pattern on the sample for determining the semiconductor process causing the defect.

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Claim 8 (original): The method of the claim 7 wherein the method utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample.

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Claim 9 (original): The method of claim 7 wherein the chemical state analysis comprises a point scan analysis.